REMARKS

Claims 1, 9-11, 14-17, and 20-21 are currently pending. Claims 1, 11, and 14-17 are being amended. Claim 2-8, 12, 13, 18, and 19 have been cancelled. Applicant reserves the right to pursue the original claims and other claims in this and other applications.

Claims 1, 11, and 16-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tabata (US 6,088,006) ("Tabata") in view of Tatsuzawa (US 6,441,844) ("Tatsuzawa"), and further in view of Aritake et al. (US 5,872,590) ("Aritake"). This rejection is respectfully traversed.

In order to establish a *prima facie* case of obviousness "the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2142. None of Tabata, Tatsuzawa, and Aritake et al., even when considered in combination, teach or suggest all limitations of independent claims 1, 11, or 16.

Independent claims 1, 11, and 16 have been amended to emphasize at least a distinction between the claimed invention and the references cited by the Office.

In claims 1, 11, and 16 object data comprises first and second objects. First objects are those objects being outside a stereoscopic viewable range of a stereoscopic display device in a 3D coordinate space. As such, the first objects are considered as being made of polygons having 3D coordinates and are clarified as being viewed in a planar view. Second objects are those objects being inside a stereoscopic viewable range of a stereoscopic display device in a 3D coordinate space. These objects are viewed in a stereoscopic view

For example, in FIGs. 3A-3F, objects 2 and 3 are first objects and object 1 is a second object. Objects 2 and 3 are positioned outside a stereoscopic viewable range of a stereoscopic display device in a 3D coordinate space; therefore objects 2 and 3 are to be viewed in a planar view. Object 1 is positioned inside a stereoscopic viewable range of a stereoscopic display device in a 3D coordinate space; therefore object 1 is to be viewed in a stereoscopic view. Accordingly, the object data of the first objects is converted to a reference camera coordinate system data with its origin at a

reference camera. The object data of the second objects is converted to a parallax camera coordinate system data with their origins being at a parallax cameras for right and left eyes.

The converted reference camera coordinate system data and the parallax camera coordinate system object data for right eye are drawn as image data for the right eye in a video memory. The converted reference camera coordinate system data and the parallax camera coordinate system object data for left eye are drawn as image data for the left eye in a video memory. Then, the image data for the right and left eyes drawn in the video memory are synthesized and displayed on a stereoscopic display device as images mixing stereoscopic and planar objects.

Claim 1 recites, *inter alia*, a method for displaying stereoscopic images, comprising the steps of:

> converting stored model object data of first objects, made of polygons having 3D coordinates, which are to be viewed in a planar view because of image formation positions being outside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to reference camera coordinate system data with its origin at a reference camera;
>
> converting stored model object data of second objects, made of polygons having 3D coordinates, which are to be viewed in a stereoscopic view because of image formation positions being inside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to parallax camera coordinate system data for right and left eyes respectively with their origins at parallax cameras for right and left eyes having predetermined parallax angles;
>
> drawing the reference camera coordinate system data and the parallax camera coordinate system data for right eye as image data for right eye in a video memory;
>
> drawing the reference camera coordinate system data and the parallax camera coordinate system data for left eye as image data for left eye in the video memory; and
>
> synthesizing the image data for right and left eyes drawn in the video memory and displaying, on a stereoscopic display device, images mixing first and second objects.

Tabata discloses:

> a stereoscopic image generating apparatus comprising storage means for storing three-dimensional shape data of a plurality of objects, initial position data of the plurality of objects in a three-dimensional coordinate system, motion data of the plurality of objects in the three-dimensional coordinate system, and position data of first and second viewpoints in the three-dimensional coordinate system, first rendering means for generating, on the basis of the data stored in the storage means, first two-dimensional image data obtained by rendering the plurality of objects in the three-dimensional coordinate system from the first viewpoint, second rendering means for generating, on the basis of the data stored in the storage means, second two-dimensional image data obtained by rendering the plurality of objects in the three-dimensional coordinate system from the second viewpoint, and two-dimensional image data control means for controlling to translate all two-dimensional image data of at least one of the first and second two-dimensional image data which are obtained by the first and second rendering means for a specific object arbitrarily selected from the plurality of objects, so that a difference between horizontal displacement amounts from the centers of the first and second two-dimensional image data is set substantially constant. "

(Tabata, Summary)

Tabata indicates the purpose of its invention as generating a stereoscopic image which can be easily observed by an observer. In Tabata, two-dimensional image data generated respectively from right and left eye view points are shifted in horizontal direction, so that a difference between horizontal displacement amounts from the centers of the two-dimensional image data is set constant. Tabata teaches "stereoscopic image generating apparatus of this embodiment generates left and right images (pictures) and then shifts them." Col. 9, ln. 58-60. Specifically, Tabata indicates shifting for two-dimensional image is performed after a rendering process.

Tabata fails to disclose "converting stored model object data of first objects, made of polygons having 3D coordinates, which are to be viewed in a planar view because of image formation positions being outside a stereoscopic viewable range of stereoscopic display device in a

3D coordinate to reference camera coordinate system data with its origin at a reference camera" as noted by the Office. Tabata also fails to disclose "synthesizing the image data for right and left eyes drawn in the video memory and displaying, on a stereoscopic display device, images mixing first and second objects" as also noted by the Office. Thus, Tabata does not anticipate the claimed invention.

Tatsuzawa discloses:

> Left and right video cameras ... disposed on both sides of a front video camera.... Solid-pictorial video signals used upon signal transmission are generated by using video signals outputted from the left and right video cameras with respect to a video signal outputted from the front video camera. The left and right video cameras make use of simplified video cameras and are cameras with no zoom functions or the like. The video signals obtained from the left and right video cameras are used as signals for forming a solid picture. In the present example, only solid information with respect to a main picture is transmitted as a video signal to reduce the amount of transmission. A motion-compensated DCT encode process using the front video signal as a reference picture is performed to extract only the video signal having the solid information from the left and right video signals. Since the simplified video cameras can be utilized, solid-pictorial video signals can be generated at low cost.

(Tatsuzawa, Abstract)

Tatsuzawa discloses a video data generating system, in which video data for a stereoscopic view can be generated with low cost. In the system of Tatsuzawa, a front camera, used as reference camera, and simple view cameras to the left and right of the reference camera, are applied on a video signal output from the front camera to generate video signals for stereoscopic view. As simple cameras only produce low quality picture. The system of Tatsuzawa is to be used to display a stereoscopic view of a real space. Tatsuzawa teaches only one object is captured by the reference, left and right cameras.

Tatsuzawa fails to disclose "converting stored model object data of first objects, made of polygons having 3D coordinates, which are to be viewed in a planar view because of image

formation positions being outside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to reference camera coordinate system data with its origin at a reference camera." The Office incorrectly suggests that Tatsuzawa teaches:

> The conversion of stored model object data to a reference coordinate system data to be displayed in a planar view with its origin at a reference camera in column 9 lines 21-23 where it is described that a three dimensional object in a three-dimensional space is converted to a two-dimensional or planar view from a front video camera, or reference camera, as show in Figure 1 as element 18M. Therefore the converted object data of the three dimensional object 12 of Figure 1 results in the conversion of the pixels and coordinates of the object from its three-dimensional space to a two-dimensional view for display, as described in column 4 lines 33-34.

Applicant respectfully submits that the Office's interpretation of Tatsuzawa is misapplied to the claimed invention. Assuming that an object is "outside a stereoscopic viewable range of stereoscopic display device," Tatsuzawa's front camera 18M captures and stores the front of an object (Tatsuzawa, Col. 4, lines 33-43). Tatsuzawa's front camera 18M does not capture and store "stored model object data of first objects, made of polygons having 3D coordinates, which are to be viewed in a planar view." As such, Tatsuzawa also fails to disclose "synthesizing the image data for right and left eyes drawn in the video memory and displaying, on a stereoscopic display device, images mixing first and second objects" as also noted by the Office. Thus the invention of Tatsuzawa is different from and does not anticipate the claimed invention and does not cure the deficiencies of Tabata.

Aritake discloses a:

> position of an observer in a stereoscopic observing region is detected by a position detecting unit. A right-eye image and a left-eye image which are seen from the detecting position are formed by an image forming unit and displayed on a display. By setting an aperture position of a projection optical system, the right-eye image is projected to the right-eye position of the observer and the left-eye image is projected to the left-eye position, thereby allowing a stereoscopic image to be observed. Further, an aperture is set so as to project the right-eye image or left-eye image to a position different

> from the detecting position of the observer, thereby allowing a same image to be seen to both eyes of another observer and allowing a two-dimensional image to be observed.

(Aritake, Abstract)

Aritake teaches a system in which one or more viewers can observe a stereoscopic image as moving, without any supplemental glasses, and viewers other than those observing the stereoscopic image can observe a clear two-dimensional image. Stereoscopic images or two-dimensional images can be observed by viewer, depending on the viewer's position. Aritake uses two real cameras, the left and right cameras, to capture and then subsequently display stereographic images.

Aritake fails to disclose "converting stored model object data of first objects, made of polygons having 3D coordinates, which are to be viewed in a planar view because of image formation positions being outside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to reference camera coordinate system data with its origin at a reference camera." Aritake, to the contrary, is directed to capturing stereoscopic images. Thus, Aritake also fails to disclose "synthesizing the image data for right and left eyes drawn in the video memory and displaying, on a stereoscopic display device, images mixing first and second objects." Thus, the invention of Aritake is different from and does not anticipate the claimed invention and does not cure the deficiencies of Tabata and Tatsuzawa.

Since not one of Tabata, Tatsuzawa, and Aritake teach or suggest the above-quoted limitations of claim 1, this claim is not rendered obvious over the cited references. Thus, the rejection of claim 1 should be withdrawn and claim 1 and its dependant claims allowed over Tabata, Tatsuzawa, and Aritake for at least the reasons cited above.

Nor is there provided in the references any motivation to combine their teachings. Even if there was motivation provided in the references to combine their varied teachings, which there is not, the combination of Tabata, Tatsuzawa, and Aritake still would not achieve the claimed invention for at least the reasons noted above. Thus, the rejection of claim 1 should be withdrawn

and claim 1 and its dependant claims allowed over Tabata, Tatsuzawa, and Aritake for at least the reasons cited above.

Claim 11 recites, *inter alia*, "a geometry unit for converting object data of first objects made of polygons having 3D coordinates, which are to be viewed in a planar view because of image formation positions being outside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to reference camera coordinate system data with its origin at a reference camera" and a "rendering unit for synthesizing the image data for right and left eyes drawn in the video memory, wherein a stereoscopic display device is provided that displays images mixing first and second objects using image data for right and left eyes synthesized by the rendering unit."

Claim 16 recites, *inter alia*, "allowing the geometry unit to convert object data of the first objects which are to be viewed in a planar view because of image formation positions being outside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to reference camera coordinate system data with its origin at a reference camera and "synthesizing the image data for right and left eyes drawn in the video memory and displaying, on a stereoscopic display device, images mixing the first and second objects."

Thus, claims 11 and 16 have similar claim limitations as claim 1 and are allowable for at least the reason noted above with respect to claim 1.

Claims 12 and 13; and 17 and 18 depend from claim 11 and 16, respectively, and are allowable for at least the reasons noted above with respect to claims 11 and 16.

Claims 9-10, 14-15, and 20-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tabata in view of Tatsuzawa, and further in view of Aritake and further in view of Hoglin (U.S. Pat. No. 5,949,477)("Hoglin"). This rejection is respectfully traversed.

Claims 9-10 depend from claim 1 and are patentable at least for the reasons mentioned above. Claims 14-15 depend from claim 11 and are patentable at least for the reasons mentioned

above. Claims 20-21 depend from claim 16 and are patentable at least for the reasons mentioned above.

Further, Hoglin discloses a:

> three-dimensional stereoscopic system using two camera units mounted onto a sub-base and each camera unit mounted onto a moveable base. The bases rotates and are synchronized to turn with each other to control the horizontal viewing angle. Both camera units are synchronized to scan an image source in unison. The video signals from the camera units are loaded into a switching unit which alternatively outputs information from one camera unit and then the other camera unit. In this manner, both a left eye view and a right eye view are transmitted to a television monitor to be viewed as a stereoscopic image.

(Hoglin, abstract)

With respect to claim 1, Hoglin fails to disclose "converting stored model object data of first objects, made of polygons having 3D coordinates, which are to be viewed in a planar view because of image formation positions being outside a stereoscopic viewable range of stereoscopic display device in a 3D coordinate to reference camera coordinate system data with its origin at a reference camera." Hoglin, to the contrary, is directed to capturing stereoscopic images. Thus, Hoglin also fails to disclose "synthesizing the image data for right and left eyes drawn in the video memory and displaying, on a stereoscopic display device, images mixing first and second objects." Thus, the invention of Hoglin is different from and does not anticipate the claimed invention and does not cure the deficiencies of Tabata and Tatsuzawa and Aritake. Thus, the rejection of claims 9-10 which depend from claim 1 should be withdrawn and are patentable over Tabata, Tatsuzawa, Aritake, and Hoglin.

As noted above, claims 11 and 16 have similar claim limitations as claim 1 and are allowable over Tabata, Tatsuzawa, Aritake, and Hoglin for at least the reason noted above with respect to claims 1 and 9/10.

Nor is there provided in the references any motivation to combine their teachings. Even if there was motivation provided in the references to combine their varied teaching, which there is not, the combination of Tabata, Tatsuzawa, Aritake, and Hoglin still would not achieve the claimed invention for at least the reasons noted above. Thus, the rejection of claim 1 should be withdrawn and claim 1 and its dependant claims allowed over Tabata, Tatsuzawa, Aritake, and Hoglin for at least the reasons cited above.

Claims 12 and 13; and 17 and 18 depend from claim 11 and 16, respectively, and are allowable over Tabata, Tatsuzawa, Aritake, and Hoglin for at least the reasons noted above with respect to claims 11 and 16.

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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